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None

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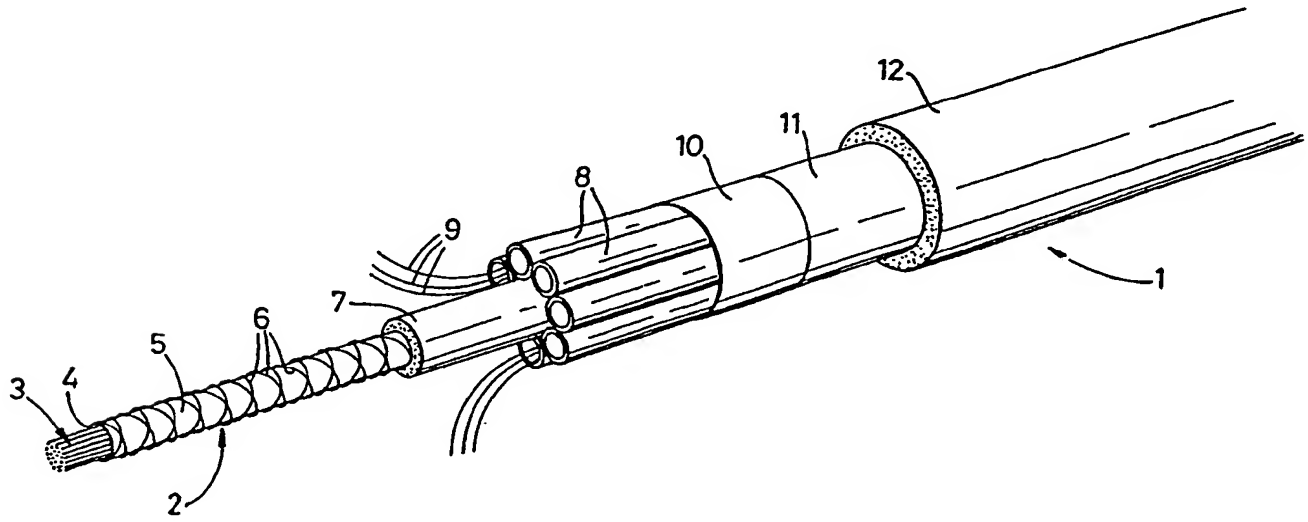
(54) Composite strength member

(57) A method of manufacturing a composite strength member 2 comprises coating unidirectional reinforcement fibres 3 with a thermosetting plastics resin drawing the coated fibre through a heated die to cure the resin to produce a required cross-section 4 and surface finish 5, and wrapping at least one thread 6 helically around the member after emergence from the die and adhering the thread(s) to the member with a thermosetting plastics resin. The strength member may be used in a data transmission cable having optical fibres 9 in tubes 8. The coating and adhesive resins may be the same. Fibre 6, which may be of polyester, helps key extruded plastics sleeve 7.



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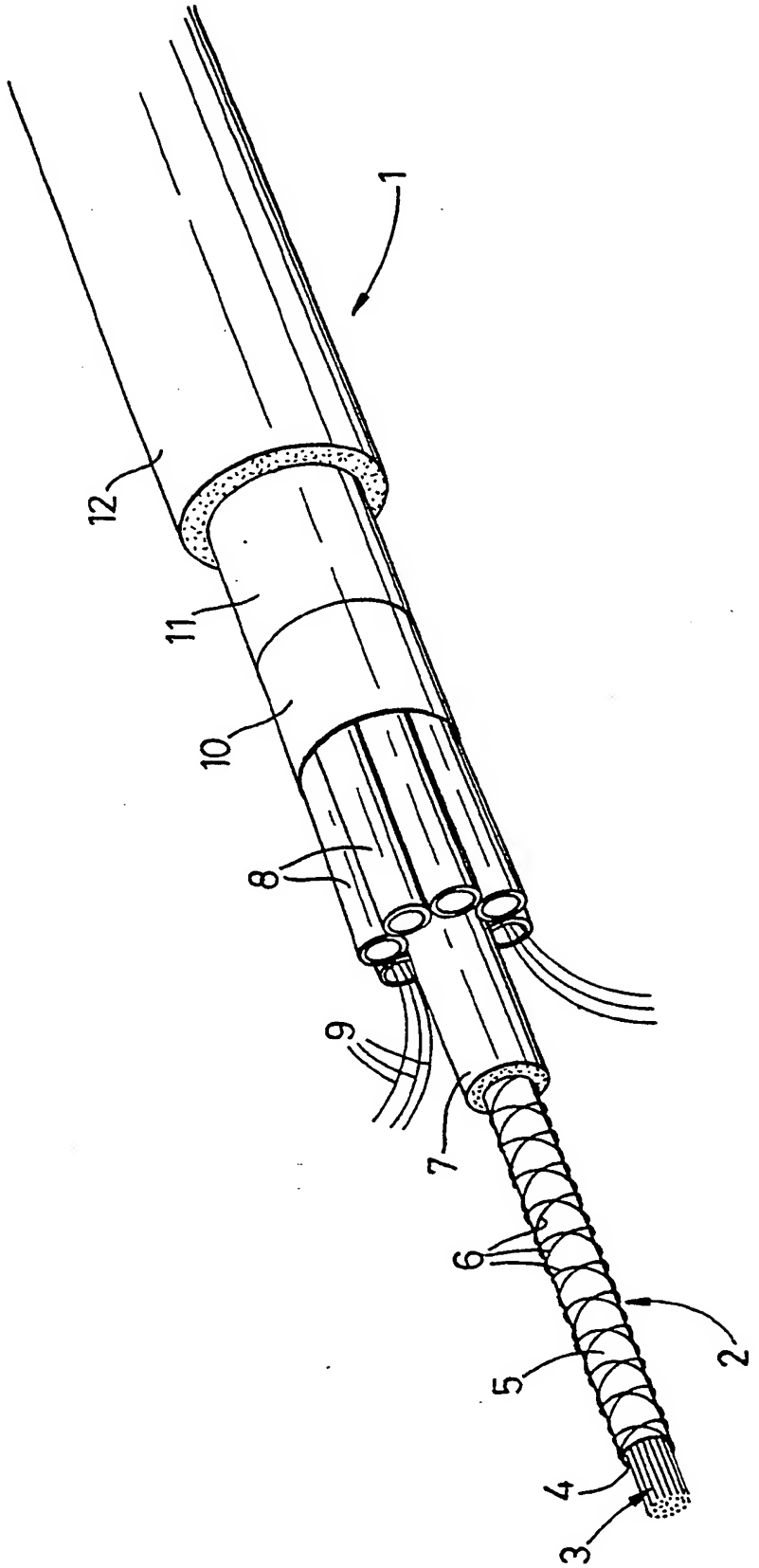
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COMPOSITE STRENGTH MEMBER

This invention relates to a composite strength member suitable for incorporation into the structure of optical fibre data transmission cable. A composite strength member is considered to be a fibre reinforcement in a thermosetting resin matrix. The composite strength member is necessary in such cables to protect the optical fibres from both tensile and compressive loads applied by installation techniques, thermal expansion and contraction, and in the case of pylon suspended overhead cables, loads caused by wind, cable weight and catenary.

In one known cable design the composite strength member is located at the axis of the finished cable and the tubes carrying the optical fibre bundles are disposed in a radial manner. A plastics extrusion coaxial to the strength member is interposed between the strength member and the tubes housing the optical fibres.

It is important to the integrity of the cable that relative displacement does not occur between the composite strength member and the coaxial extrusion. The composite strength member which is manufactured by pulling reinforcing fibres, wetted with thermosetting plastic resin, through a heated, smooth bored curing die naturally possesses a comparatively smooth surface which is liable to allow relative displacement of the coaxial extrusion which is undesirable.

It is clear that the provision of a surface feature on the composite strength member would result in a keying effect

to resist, if not eliminate, relative movement between composite strength member and cable, and the object of the present invention is to provide for the presence of a unique surface feature.

According to a first aspect of the present invention, there is provided a method of manufacturing a composite strength member comprising:-

1) coating unidirectional reinforcement fibres with a thermosetting plastics resin,

2) drawing the coated fibre through a heated die to cure the resin to produce a required cross-section and surface finish, and

3) wrapping at least one thread helically around the coated fibre/composite strength member after emergence of the latter from the die, and adhering the thread(s) to the coated/composite strength member with a thermosetting plastics resin.

According to a second aspect of the present invention, there is provided a composite strength member produced by the above defined method.

According to a third aspect of the invention of independent significance, there is provided a data transmission cable incorporating optical fibres along the centre of which extends a composite strength member in accordance with the second aspect.

Although one thread could be wrapped round the coated fibre/composite strength member, preferably at least two

threads, of opposite helix are used.

Conveniently, the thermosetting plastic resin used to adhere the thread(s) to the coated fibre/composite strength member is the same resin type as that used to coat the reinforcing e.g. glass fibres.

The thread(s) is conveniently a polyester fibre thread.

One example of an optical fibre data transmission cable in accordance with the third aspect, provided with a composite strength member in accordance with the second aspect, which member is produced by the method of the first aspect, is shown in the accompanying diagrammatic drawing.

An optic fibre data transmission cable indicated at 1 is provided with a centrally located, and longitudinally extending composite strength member 2 formed by coating a plurality of unidirectional reinforcement glass fibres 3 with a thermosetting viscous resin, e.g. contained in a reservoir, and then drawing the fibres through a heated die to provide the required cross-section, a circular cross-section 4 being indicated in the drawing with a relatively smooth surface finish 5. The smooth surface finish is interrupted and a unique surface feature is provided, by overwinding at least two glass fibre threads 6, of opposite helix, around the smooth surface finish 5, with the threads 6 being secured in place by adhesive in the form of a thermosetting plastics resin, so that a second heating step cures this resin to complete formation of the composite strength member 2.

The unique surface feature provided by the threads 6

ensures that a co-axial plastics sleeve 7 which is extruded over the composite strength member 2 is keyed to the latter to resist, if not eliminate disadvantageous relative movement. A plurality of tubes 8 housing optical fibres 9, are then assembled around the sleeve 7, and are secured in place by a first layer of wrapping 10, followed by a second layer of wrapping 11, the cable 1 being completed by an outer sheath 12, also of synthetic plastics material, being extruded over the second wrapping 11.

CLAIMS

1. A method of manufacturing a composite strength member comprising:-

1) coating unidirectional reinforcement fibres with a thermosetting plastics resin,

2) drawing the coated fibre through a heated die to cure the resin to produce a required cross-section and surface finish, and

3) wrapping at least one thread helically around the coated fibre/composite strength member after emergence of the latter from the die and adhering the thread(s) to the coated/composite strength member with a thermosetting plastics resin.

2. A method as claimed in Claim 1, wherein two threads of opposite helix are wrapped around the coated fibre/composite strength member after emergence of the latter from the die.

3 A method as claimed in Claim 1 or Claim 2, wherein the thermosetting plastics resin used to adhere the thread(s) to the coated fibre/composite strength member is the same resin type as that used to coat the reinforcing fibres.

4. A method as claimed in any preceding Claim, wherein the overwinding thread(s) is/are of polyester fibre.

5. A method of manufacturing a composite strength member substantially as hereinbefore described with reference to the accompanying drawing.

6. A composite strength member produced by the method of

any of Claims 1 to 5.

7. A composite strength member produced by the method of any of Claims 1 to 5 and substantially as hereinbefore described with reference to the accompanying drawing.

8. An optical fibre data transmission cable incorporating a composite strength member as defined in Claim 6 or Claim 7.

9. An optical fibre data transmission cable incorporating a composite strength member substantially as hereinbefore described with reference to the accompanying drawing.

Patents Act 1977
Examiner's report to the Comptroller under Sectic 17 (The Search Report)

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Relevant Technical fields

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(ii) Int CL (Edition 5) D078 : G02B

Search Examiner
G WERRETT

Databases (see over)

(i) UK Patent Office

(ii)

Date of Search
27 APRIL 1992

Documents considered relevant following a search in respect of claims 1-9

Category (see over)	Identity of document and relevant passages	Relevant to claim(s)
	NONE	

Category	Identity of document and relevant passages	Relevant to claim(s)

Categories of documents

X: Document indicating lack of novelty or of inventive step.

Y: Document indicating lack of inventive step if combined with one or more other documents of the same category.

A: Document indicating technological background and/or state of the art.

P: Document published on or after the declared priority date but before the filing date of the present application.

E: Patent document published on or after, but with priority date earlier than, the filing date of the present application.

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